

SoSAT

System-of-Systems Analysis Toolset

Highlights

What does SoSAT Enable?

- A unique approach to SoS analysis
- Multiple user-definable performance metrics
- Modeling system interdependencies and shared functionality
- Performance measurements of functionally interdependent SoS
- SoS trade study modeling, analysis, and performance assessment
- Reliability and functional availability analysis

Why is SoSAT Important?

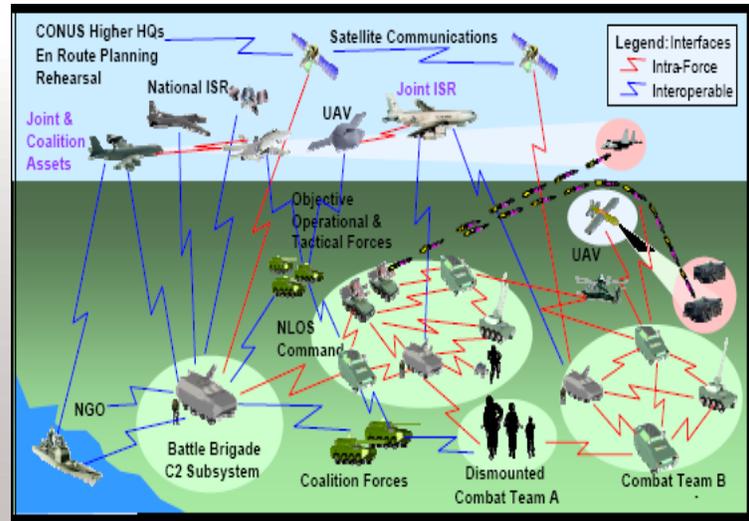
- Characterizes large-scale interdisciplinary problems that involve multiple distributed systems embedded in networks at multiple levels and in multiple domains
- Allows analysts to evaluate the readiness and sustainment of complex SoS
- Assists analysts in identifying non-intuitive, interdependent performance and logistics issues

Example Applications

- Operation and support cost analysis
- Footprint reduction and impact analysis
- Evaluation of energy efficiency improvements
- Modernization upgrade impact analysis
- Sustainment assessment
- Acquisition decisions
- Vulnerability analysis

SoSAT Overview

SoSAT is a tool designed to model and simulate multi-echelon operations and support activities of a system-of-systems (SoS). It provides logistics analysts with the ability to define operational and support environments of a SoS, ascertain measures of platform and SoS-level performance effectiveness, and determine logistics support issues. As a stochastic simulation, SoSAT characterizes sensitivity changes to all platforms, support systems, processes, and decision rules as well as platform reliability and maintainability (R&M) properties. It is designed to be a robust decision support tool for evaluating readiness and sustainment of systems, including consumables and maintenance operations. SoSAT is applicable in diverse industries such as defense, energy, aviation, and healthcare.



SoSAT

Key Features

Provides Analysts the Capability to:

- Simulate any SoS organizational structure
- Capture multiple system functionalities at any given time
- Assess multiple performance metrics of multiple systems at multiple levels of an organizational structure over time
- Support business decisions and trade-offs

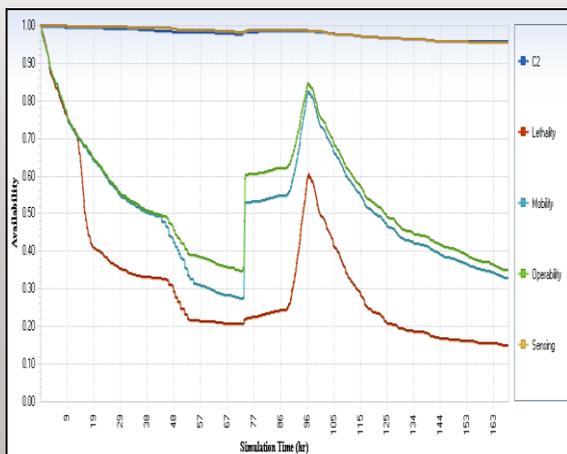
Stochastic Simulation

- Can model variability and uncertainty among various types of systems, individual instances of a system type, and from trial to trial

Advanced Data Visualization

- Real-time status of individual systems and their components
- Detailed information for all systems in the model provided at the individual system level, system type level, and organizational structure level
- Customizable results display with selectable amount and type of data for finer control of the output

Functional Availability vs. Time



Key Benefits

Basic Modeling Features

- System element reliability failures
- Consumable usage, depletion, and generation
- Maintenance activities including required spares or services
- Supply reorder for consumables and spare inventories

Advanced Modeling Features

- Combat damage modeling
- Network modeling
- Prognostics and health management
- Time-based changes to model attributes due to external conditions
- Human performance modeling

System State Model

- Encapsulates a system, its elements, and its functionality for use in the simulation
- User definable with multiple functions, components, failure modes, personnel, or functional elements of other system
- Describes a system's functionality by the states of the system's elements

System State Model	
NLOS-C Model 	
Example Elements	Example Functionality
•105 mm Cannon	- Operability
•M240 Machine Gun	- Lethality
•Sandstorm	- Mobility



Contact Us

Bruce Thompson
 CSR Program Lead, Manager
 Tel: (505) 284-4949
 bmthomp@sandia.gov